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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/955,137	09/19/2001	Kazushi Nomura	35.C15809	8430

5514 7590 02/05/2003

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EXAMINER

MACCHIAROLO, PETER J

ART UNIT PAPER NUMBER

2875

DATE MAILED: 02/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/955,137

Applicant(s)

NOMURA, KAZUSHI

Examiner

Peter J Macchiarolo

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Priority*

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d) to JP-289,184/2000, and JP-277,158/2001. All certified copies of the priority documents have been received and considered.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshioka et al. (USPN 5,872,541; "Yoshioka").
3. In regards to claim 1, Yoshioka discloses in figure 36, an electron-emitting apparatus comprising a first electrode (1), a second electrode (2) that is provided so as to be insulated from the first electrode, and an electron emitting film (3a) connected to the second electrode via the insulating layer (5). Yoshioka further discloses in figure 39D that an electrode (TE) is provided at a predetermined distance from the electron-emitting film, wherein the first electrode, the second electrode, and the electron emitting film oppose the electrode TE. Yoshioka further discloses in figures 36 and 39D, that a distance between the electrode TE and the electron emitting film is longer than a distance between the electrode TE and the second electrode, and a

distance between the electrode TE and the first electrode is longer than the distance between the electrode TE and the electron-emitting film.

Yoshioka is silent to the electrode (TE) being an anode.

However, it is well known in the art that in order for this configuration to operate properly, the electrode is required to have a positive charge.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electron emitting apparatus of Yoshioka including an anode for electrode TE, since it is well known that in order for this configuration to operate properly, the electrode is required to have a positive charge.

4. In regards to claims 8 and 9, Yoshioka teaches all of the recited limitations of claim 1 (above).

Yoshioka further teaches in figure 39D, and column 2 lines 56-60, an electron source that is formed by arranging a plurality of electron emitting apparatuses (ED) and emits electrons from at least on of the plurality of electron emitting apparatuses according to an input signal (31 and 32), with an image forming member (FP) on which an image is formed by irradiation with electrons emitted from the electron source, and this configuration is capable of controlling the position of the electron emitting region.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electron emitting apparatus of Yoshioka, wherein an electron source is formed by arranging a plurality of electron emitting apparatuses (ED) and emits electrons from at least on of the plurality of electron emitting apparatuses according to an

input signal (31 and 32) and having an image forming member (FP) on which an image is formed by irradiation with electrons emitted from the electron source, since Yoshioka teaches this configuration is capable of controlling the position of the electron emitting region.

5. Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshioka et al. (USPN 5,872,541; "Yoshioka") in view of Iwase et al. (USPN 6,135,839; "Iwase").

6. In regards to claims 2-5, Yoshioka teaches all of the recited limitations of claim 1 (above).

Yoshioka is silent to a first and second voltage applying means.

However, Iwase teaches in figure 10 and column 11 lines 58-65, that electrons are emitted from the electron emitting film, and that a first voltage potential is applied to the anode is equal to or higher than a voltage potential applied to the first electrode and the second electrode, and this configuration improves emission efficiency. Iwase further teaches there is a second voltage potential applied between the first electrode and the second electrode, and if a voltage potential applied to the first electrode is below a potential to the second electrode, no electrons will be emitted, and this configuration allows a user to properly control the electron emitter.

Therefore, regarding claim 2, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electron emitting apparatus of Yoshioka, including a first voltage applying means for applying to the anode a potential that is higher than potentials applied to the first electrode and the second electrode, since Iwase teaches this configuration improves emission efficiency.

Therefore, regarding claim 3, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electron emitting apparatus of Yoshioka, including a second voltage applying means for applying a voltage between the first electrode and the second electrode, since Iwase teaches this configuration improves emission efficiency.

Therefore, regarding claim 4, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electron emitting apparatus of Yoshioka, wherein electrons are emitted from the electron emitting film, and a potential applied to the first electrode is set so as to be at least equal to a potential applied to the second electrode, since Iwase teaches this configuration improves emission efficiency.

Therefore, regarding claim 5, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electron emitting apparatus of Yoshioka, wherein no electrons are emitted from the electron emitting film when a potential applied to the first electrode is set below a potential applied to the second electrode, since Iwase teaches this configuration improves emission efficiency while allowing a user to properly control the electron emitter.

7. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshioka et al. (USPN 5,872,541; "Yoshioka") in view of Deguchi et al. (USPN 6,400,091; "Deguchi").

8. In regards to claims 6 and 7, Yoshioka teaches all of the recited limitations of claim 1 (above).

Yoshioka further teaches in column 6 lines 36-47 that the electron emitting film includes carbon or a carbon compound, and this material is readily capable of emitting electrons by electron bombardment and has strong thermal resistance and corrosion resistance.

Yoshioka is silent to the carbon compound including one of diamond like carbon, graphite, diamond, a carbon nanotube, a graphitic nanofiber, and a fullerene.

However, Deguchi teaches in column 3 lines 33-50, that when using allotropes of carbon in an electron emission element, a graphene structure, a carbon nanotube, and a diamond produce an electron emission element with a particularly high electron emission ability.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electron emitting apparatus of Yoshioka, wherein the electron emitting carbon compound includes one of diamond like carbon, graphite, diamond, a carbon nanotube, a graphitic nanofiber, and a fullerene, since Deguchi teaches these elements allow for an electron emission element with a particularly high electron emission ability.

9. Claims 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deguchi et al. (USPN 6,400,091; "Deguchi").

10. In regards to claim 10, Deguchi discloses in figure 1a, a first electrode (12) arranged on a surface of a substrate (11), an insulating layer (16) arranged on the first electrode, a second electrode (15) arranged on the insulating layer, and an electron emitting film (14) arranged on the second electrode. Deguchi further shows that the second electrode has two side surfaces that oppose each other in a direction substantially parallel to the surface of the substrate (see below).

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Deguchi is silent to the electron-emitting film being arranged so as to be shifted to be close to one of the two side surfaces.

However, Deguchi further teaches in column 5, lines 41-54 that the second electrode 15 is formed so as to easily control emission of electrons from the electron emission member 14, and the electron emission member 14 is arranged to be shifted, via the cathode 12, in the vicinity of one side of the second electrode 15 to easily control electron emission. Deguchi further teaches this configuration allows an electron emission element being capable of emitting highly focused electrons which are produced easily.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electron emitting device of Deguchi, including the electron-emitting film being arranged so as to be shifted close to one of the two side surfaces,

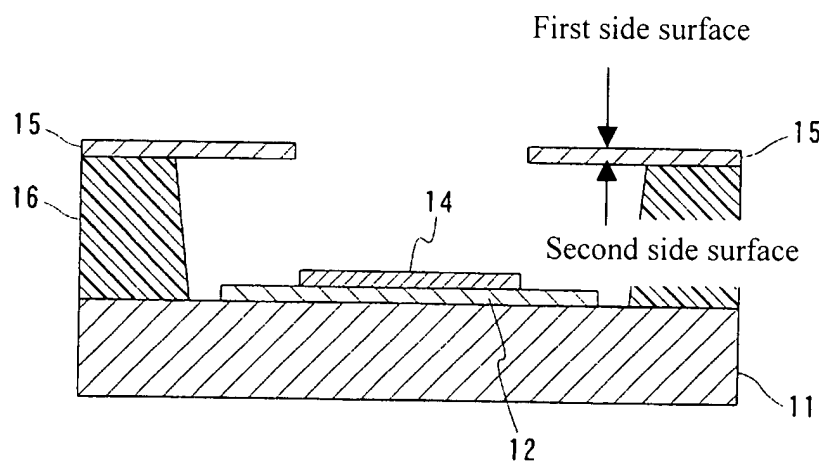


Fig.1A

since Deguchi teaches this configuration allows an electron emission element to emit highly focused, easily produced electrons.



11. In regards to claims 11-15, Deguchi teaches all of the recited limitations of claim 10 (above).

Deguchi further teaches in column 6 lines 44-61, that it is preferable for the electron emission element to comprise allotropes of carbon, i.e. carbon nanotubes, fibers, and a plurality of graphenes, and these elements produce an electron emission element with a particularly high electron emission ability.

Deguchi is silent to the plurality of graphenes being laminated in an axial direction of the fiber.

However, this configuration is well known in the art to further improve electron emission.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electron emitting device of Deguchi, further wherein the electron emitting film is an aggregate of fibers whose main ingredients is one of a carbon nanotube and a graphite nanofiber or a plurality of graphenes laminated in an axial direction of the fiber, since it is well known in the art that this configuration further improves electron emission.

12. Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deguchi et al. (USPN 6,400,091; "Deguchi") view of Iwase et al. (USPN 6,135,839; "Iwase").

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13. In regards to claims 16-17, Deguchi teaches all of the recited limitations of claim 11 (above).

Deguchi is silent to the exact potential applied to the first electrode and the second electrode.

However, Iwase teaches in figure 10 and column 11 lines 58-65, that electrons are emitted from the electron emitting film, and that a first voltage potential is applied to the first electrode is equal to or higher than a voltage potential applied to the second electrode, and this configuration improves emission efficiency. Iwase further teaches if a voltage potential applied to the first electrode is below a potential to the second electrode, no electrons will be emitted, and this configuration allows a user to properly control the electron emitter.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electron emitter of Deguchi, including a first voltage potential applied to the first electrode being equal a voltage potential applied to the second electrode and when a voltage potential applied to the first electrode is below a potential of the second electrode no electrons will be emitted, since Iwase teaches this configuration improves emission efficiency and allows a user to properly control the electron emitter.

14. In regards to claims 18-19, Deguchi teaches all of the recited limitations of claim 10 (above).

Deguchi further teaches in figure 3 that a plurality of electron emitting devices of claim 11 are arranged and comprise a phosphor (44), and this configuration is well known in the art to successfully produce an image with a high degree of definition.

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Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the electron emitting device of Deguchi, including a plurality of electron emitting devices of claim 11 being arranged, and further comprise a phosphor, since this configuration is well known in the art to produce an image with a high degree of definition.

### *Conclusion*

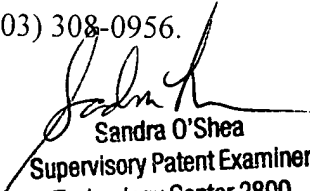
15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kumar et al. (USPN 5,543,684; "Kumar") published August 6, 1996, discloses a flat panel display using diamond thin films. Kumar's electron-emitter configuration resembles Applicant's claimed invention, but is not relied upon in the instant Office Action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Macchiarolo whose telephone number is (703) 305-7198. The examiner can normally be reached on 7.30 - 4:30, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (703) 305-4939. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

pjm  
January 30, 2003

  
Sandra O'Shea  
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